#### STATE GOVERNMENT

## **Job Families**

## **Background**

California State government's state civil service system covers over 150,000 permanent full-time employees, and seasonally up to 10,000 additional employees. These employees are divided into over 4,500 job classifications in more than over 70 departments. Approximately 6,600 of these employees work in one of 65 IT job classifications.

Job classification schemes are based on the premise that jobs are stable and "can be defined by a description that consists of a set of fairly static task sets and the specifications (knowledge, skills, and abilities) to perform those tasks." In such a scheme, each job is a box on an organization chart, part of a larger hierarchy, with a starting pay rate that can be reviewed and adjusted for experience over time. The Little Hoover Commission notes that: "Classification systems exist to ensure consistency and fairness in an employee's assignment of work, the level and value of the work, and the pay rate. Classification is not intended to be flexible: consistency is the desired result." Job classification schemes enhance control and supervision. They work less well when organizations and skills sets are changing rapidly, as is occurring in IT. 61

## State IT Job Classifications

Job classes are a backbone of the state's IT personnel structure. An employee entering state service is hired into a position within a job classification: "A classification defines the minimum qualifications, the allowable duties, and the compensation for every employee." Classes in a classification series describe the general scope of the work. However the IT job class descriptions used by the state do not fit the IT job functions as described by California companies (see page 7). This lack of compatibility makes it difficult for the state to assess comparable salaries or compete and recruit for skilled employees, and muddles career development. For example, the Information Systems Technician classification series description is so general that it covers a broad range of IT work (including operations, data administration, networks, and supervision):

To perform a variety of technical duties in support of the operation of electronic information processing systems, such as data processing systems, microcomputers, multifunction automated office systems, and teleprocessing networks or systems; and to supervise others in the performance of information processing activities and related technical tasks. §§§

The job classes in this series include: Information Systems Technician, Information Systems Technician Specialist I, Information Systems Technician Supervisor I, Information Systems Technician Specialist II, and Information Systems Technician Supervisor II.

Within IT classification series, jobs have defined descriptions. However they are so general as to not provide a clear functional description nor an understandable career ladder. For example, the Information Systems Technician Specialist II mixes together project and staff management, software development and applications, and systems operations/administration:

Under general direction, incumbents work independently or as team leaders, and perform duties including, but not limited to: scheduling processing in a multiple system environment using appropriate scheduling software; coordinating processing of the largest most complex systems or having lead responsibility for complex teleprocessing across multiple organizations; investigating and resolving system performance problems; coordinating equipment modification and installation tasks; developing, testing and implementing new and revised fourth generation programs; and acting as technical consultant and troubleshooter on the most complex systems.

State job IT classifications were established in 1968, 1972, 1974, and 1975, with limited changes in 1989. Their job descriptions emphasize the educational knowledge required to run large mainframe computers. Although the personal computer (PC) became a common work tool in the late 1970's, most IT classifications were not updated to account for that change. Thus most state IT job classifications have not kept up with the tremendous technological advances in the last 20 years and do not describe current work needs. For this reason, they are unsuitable as a basis for recruiting, hiring, paying and promoting IT employees. The result is a recruitment and retention problem.

An inflexible system can become ineffective and dysfunctional if people need to work around it in order to get work done. A recent Department of Personnel Administration (DPA) survey found that many state IT classifications bear little resemblance to the actual duties of the jobs. For example, the task of developing virus protection policies and procedures for computerized systems and interfaces is performed by: Information Systems Technicians, Systems Software Specialists, Computer Operators, Information Systems Analysts, Data Processing Managers, Technical Supervisors, and Programmers.

The state's outdated IT job classifications set minimum educational requirements for employees and establish time-in-grade for promotional purposes. These minimum requirements may not be the best indicators of a candidate's ability to perform job duties in today's IT environment. One result can be hiring of employees who are not well qualified to assist the state's current technology needs. Conversely, a potential candidate may not meet the state's educational minimum hiring requirements. For example, some qualified technical experts have not completed a conventional university educational experience. The most famous might be Steve Jobs, who dropped out of college and founded Apple Computer. The Department of Industrial Relations in San Francisco identified a rich source of IT candidates at the Computer Learning Center. However most of the candidates did not meet the required minimum college graduation

qualifications for entry level Associate Programmer Analyst or Associate Information Systems Analyst. <sup>63</sup>

In the summer of 1998, a number of state agencies managers formed a Task Force on Information Technology Staff Recruitment and Retention. The IT Task Force surveyed 37 state agencies about problems in recruiting and retaining IT professionals.\*\*\* The survey results found strong support for a different IT job classification model. Managers stated that the current classification system restricts a department's ability to assign employees work in emerging technologies. Outdated job classifications fail to value the new and emerging skills needed for a constantly evolving technology. One response would be to align state IT job categories and pay with the job categories and salary structures utilized by California businesses.

Theoretically, every new job is classified or assigned by state personnel specialists to the job classification that appears to best match the description of the duties of the position. However, job descriptions can be written to "fit" a particular classification. Managers may do this in order to recruit at a higher salary level, or to facilitate a transfer or promotion. Class proliferation occurs when agencies have a problem identifying an existing class to use to hire an employee with specific skills at a competitive pay level. Creating a new job class can also restrict higher compensation to a select group and consequently save the state money, since the benefits of a higher salary level are restricted to a small number of employees.

An analysis by DPA found that even though the state has 65 IT classifications, 37 percent of IT employees fall into two classes: Associate Information Systems Analyst and Associate Programmer Analyst. Three classifications have only one employee each and are unique to a specific state agency (see Table 6 on the following page).

The more classes the classification structure has, the more cumbersome and the less flexible the structure becomes. This is because employees cannot move easily from job classification to job classification and there is no logical promotional ladder. In addition, it creates a heavier workload for the personnel staff, which has to develop and administer examinations for the different job classifications. Both the hiring manager and the applicant can become confused trying to figure out which classification is the best fit.

\_

<sup>\*\*\*</sup> Of the 37 state agencies surveyed, 25 completed and returned the survey within the time frame.

Camorma	Juic 11 State	Job Classifications (1998)	ш.е
Title	# of Employees in class	Title	# of Employees in class
Associate Information Systems Analyst Specialist (Specialist)	1545	Information Technology Spec. II	20
Associate Programmer Analyst	986	Computer Operations Supv. II	18
Assistant Information Systems Analyst	528	Systems Software Spec. III (Supv.)	17
Information Systems Technician	397	Information Technician I	17
Staff Information Systems Analyst (Specialist)	341	Information Systems Technician Supv. II	16
Staff Programmer Analyst (Specialist)	322	Sr. Electronic Data Processing Acquisition Spec.	16
Systems Software Specialist I (Technical)	217	Staff Electronic Data Processing Acquisition Spec.	13
Information Technology Specialist I	199	Health & Welfare Agency Data Center Supv. IV	12
Computer Operator	191	Information Systems Manager	10
Data Processing Mgr. II	167	Health & Welfare Agency Data Manager	10
Data Processing Mgr. I	160	Computer Specialist II	10
Information Technology Specialist I	158	Systems Software Spec. II (Supv.)	9
Systems Software Specialist II (Technical)	126	Associate Program Systems Analyst	8
Information Systems Technician Specialist I	125	Information Technology Spec. III	8
Data Processing Mgr. III	113	Information Technology Spec. III	8
Programmer II	92	H & W Agency Data Center Supv. III	6
Sr. Information Systems Analyst (Specialist)	78	Information Technician II	6
Assoc. Systems Software Specialist (Technical)	73	Staff Programmer Systems Analyst (Spec.)	5
Continued			
Sr. Programmer Analyst (Specialist)	70	Information Systems Supv. IV	5
Programmer G. C. L. C. L	61	Data Processing Manager IV	4
Staff Information Systems Analyst (Supervisor)	51	Information Systems Supervisor II	3
Information Technology Specialist III	49	Associate Programmer Analyst (Supervisor)	2
Senior Programmer Analyst (Supervisor)	47	H & W Data Center Supv. I	2
Staff Programmer Analyst (Supervisor)	41	H & W Data Center Supv. II	2
Information Systems Technician	40	Instructional Systems Engineer,	2
Specialist II Systems Software Specialist III (Technical)	39	Commission On Peace Sr. Program Systems Analyst (Supervisor)	2
Computer Operator Specialist I	36	Staff Program Systems Analyst (Supervisor)	2
Associate Information Systems Analyst (Supervisor)	34	Systems Software Spec. I (Technical)	2
Senior Information Systems Analyst (Supervisor)	30	Chief, Information Systems, State Controller's Off	1
Information Systems Technician Sup I	25	Information Systems Supervisor, Ca. Postsecondary .	1
Information Tech I	22	Sr. Instructional Systems Engineer, Commission	1
Subtotal	6,327	Subtotal	238
	· · · · · · · · · · · · · · · · · · ·	TOTAL of TWO COLUMNS	6,565

DPA is currently reviewing and revising the state's IT job classifications, an 18-month process that is nearing completion. The diagram on the next page shows DPA's proposed new IT job class structure. The job classes are similar to the five "broadband" classes developed by the Health and Welfare Agency Data Center (HWDC) as a state pilot project. For example, the proposed "Information Specialist" and "Information Technician" are general classes that encompass a broad range of IT functions at HWDC. Within those classes, promotional opportunities are based on the acquisition and demonstration of specific skills.

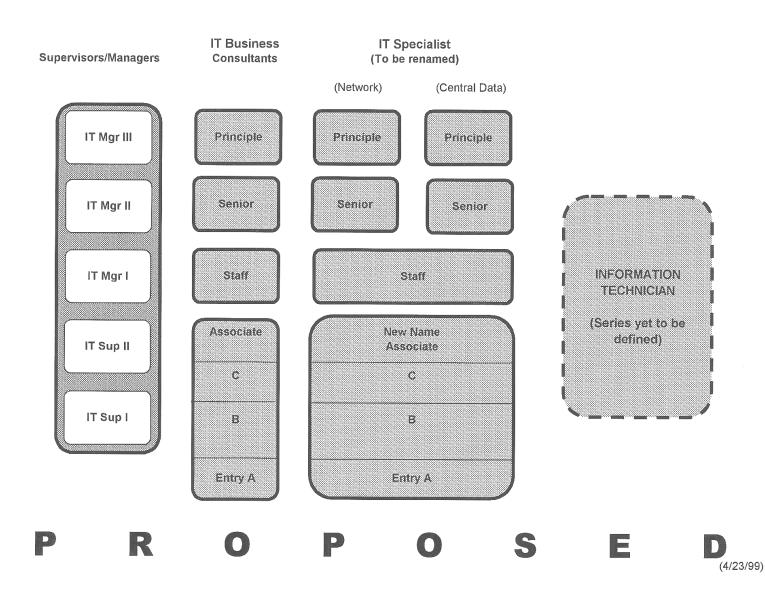
It is instructive to look at HWDC's experience with a broadband IT job class structure that is not aligned to a functional breakdown of IT work. HWDC job descriptions must carefully specify the particular skill set required for each position. Reportedly managers spend a lot of time crafting these job descriptions, guided by over 100 pages of regulations. According to HWDC's December 1998 pilot project evaluation, the classes allow more flexibility in assigning employees to meet workload demands, but the process is still time consuming and slow.<sup>64</sup>

The goal of DPA's IT reclassification effort is to better align state civil service jobs with how IT work is organized. This is a complex undertaking. A task force of personnel specialists has identified 28 IT functional areas, made up of 523 "work components", which it proposes to group into 17 job classifications. Table 7 compares the proposed DPA IT job families with those described by California companies, and as proposed by Los Angeles County. DPA's proposed IT job classes combine a wide variety of IT skills-networking, operations, database administration and software--into technician and specialist groups.

Table 7 Comparison of IT Job Families: Corporate, Los Angeles County and State Department of Personnel Administration (May 1999)						
Corporate IT Job Families	Los Angeles County Proposed IT Job Classes	Department of Personnel Administration Proposed IT Job Classifications (May 1999)				
Network/Web	Network Administrator	IT Specialist (Network)				
Operations/System Administration	Operating Systems Engineer	IT Technician				
Database Administration	Database Administrator	IT Specialist (Central Data)				
Software Applications	Applications Systems Engineer					
Business Analyst		IT Business Consultants				
Supervisor/Manager		IT Supervisor; IT Manager				

<sup>†††</sup> In December,1995,the State Personnel Board (SPB) authorized the Health and Welfare Data Center to explore alternatives to the traditional methods of examining and selecting employees under the Boards Demonstration Project Authority.

# INFORMATION TECHNOLOGY CLASSIFICATION PROJECT PROPOSED CLASS CONCEPTS



The real issue is whether the final DPA IT job classification scheme will make it easier for the state to:

- Conduct salary surveys across public and private organizations comparing similar IT work;
- Set competitive state salaries;
- Recruit qualified IT specialists;
- Train employees to enhance functional specialties and skills;
- Identify shortages in key IT workforce areas; and
- Promote career development plans.

The final proposal is yet to be fully developed. However, DPA personnel specialists believe that the proposed new IT job classification structure accomplishes these goals because it is based on a careful data analysis of IT work functions. In their view, this distinguishes the proposal from the earlier HWDC broadband pilot. DPA intends to follow up to identify gaps.

# State IT Management

The state IT Task Force survey found that some departments move state managers with limited IT backgrounds (such as personnel) into IT supervisory and management positions. Reasons include lateral transfer policies and insufficient salary levels. A significant percentage (6 percent) of state IT managers were rated by survey respondents as underqualified. Interviews with state CIOs suggest that technical competence is a serious issue. In addition, DPA's recent IT work analysis data supports the notion that IT managers need to be technically competent.

The private sector executives interviewed for this report are of the general opinion that personnel skills do not translate well into effective IT management. IT managers report in interviews that personnel administration is a different language and culture from IT (characterized as "paper pushers" vs. "nerds"). State managers who move from personnel to IT often do not have IT technical skills. They function as "translators" between the IT and the business sides of their departments, but may avoid the technical aspects of their responsibilities. Conversely, IT specialists often lack business management skills. It is difficult to find one person who has both IT project management skills and an understanding of the customer's business needs. Salary data and company interviews indicate that capable IT specialists who assume project management responsibilities are very highly compensated and valued, much more than the state currently pays its IT managers.

The 28 functional IT work clusters identified by DPA are: data access/security administration, data administration, database administration, network administration, server administration, systems administration, configuration management, information management, data storage and management, computer operations, management, IT project management, high level project management, application programming, multimedia programming, systems programming, systems analysis, business consulting, client/support services, desktop support, IT administration support, document management/imaging, procurement/licensing, quality assurance/control, voice processing, statement IT administration, strategic planning, geographic information system analysis and management.

# Los Angeles County IT Job Classifications

Los Angeles County has approximately 84,000 employees, of which 2,700 are information technology staff. The county's IT classification structure dates to the early 1980's and, like the state's classification plan (class specifications, class standards, duties, and minimum requirements), is severely outdated because of the tremendous advances experienced in the technology area.

Los Angeles County commissioned a study in 1998 to examine its IT recruitment and retention structure. As a result of the study, the county is pursuing the creation of five new broad Information Technology classes that define core competencies, with the goal of eventually deleting approximately 55 classes. There will also be three new IT management classes. Within each broad class, pay scales will be based on managerial judgements as to level of employee competency and independence. The five broad classes correspond to the private sector IT job categories described earlier in this report (Table 1), with the omission of business analyst:

- Applications Systems Engineer,
- Customer Support,
- Database Administrator,
- Network Administrator, and
- Operating Systems Engineer.

During the transition from the old to the new structure, managers will evaluate employees to determine where they fit into the new job classes. Employees will be reassigned and transferred either voluntarily or by administrative reassignment. Employees may receive a 5.5 percent salary increase with the move.

Table 8 Los Angeles County PROPOSED INFORMATION TECHNOLOGY CLASS STRUCTURE Proposed Ranges									
Series/Classes	Series/Classes Directed Independent Expert Leadership Vision								
Applications Systems Engineer	(\$35,100 - 43,900 - 52,700)	(\$42,700 - 53,400 - 64,100)	(\$51,500 - 64,400 - 77,300) (BCP=\$70,850)	(\$59,800 - 74,700 - 89,600)	(\$71,000 - 88,800 - 106,600)				
Network Administrator	(\$37,000 - 46,300 - 55,600)	(\$45,000 - 56,300 - 67,600)	(\$53,500 - 66,900 - 80,300) (BCP=\$69,700)	(\$60,900 - 76,100 - 91,300)	(\$68,200 - 85,300 - 102,400)				
Customer Support	(\$31,900 - 39,900 - 47,900)	(\$38,000 - 47,500 - 57,000)	(\$48,200 - 60,200 - 72,200) (BCP=\$60,350)	(\$59,200 - 74,000 - 88,800)					
Database Administrator	(\$32,900 - 41,100 - 49,300)	(\$40,000 - 50,000 - 60,000)	(\$50,300 - 62,900 - 75,500) (BCP=\$71,850)	(\$63,000 - 78,800 - 94,600)	(\$73,800 - 92,300 - 110,800)				
Operating Systems Engineer		(\$44,900 - 56,100 - 67,300)	(\$55,300 - 69,100 - 82,900) (BCP=\$77,000)	(\$63,700 - 79,700 - 95,700)	(\$72,700 - 90,900 - 109,100)				
Source: Los Angeles County BCP=Budget Change Proposal									

## Compensation

California's civil service pay and classification structures are not designed to respond quickly to market pressures: "The compensation policies of public sector organizations generally give higher priority to maintaining internal equity than to adjusting to the external labor market." The complex matrix of job classifications and pay steps make any adjustment extremely difficult. As a result, the state is poorly positioned to compete with the private sector for skilled IT employees in high demand.

Just as the goal of the classification process is to provide consistency in state government operations, pay structures are intended to bring consistent and fair treatment to employee salary determinations. Salary increases are determined by progressive steps tied to the length of time an employee has worked for an organization. One result of this tightly interwoven structure is that it is difficult to competitively increase the salary of an IT worker with highly valued skills. A costly upgrade of the entire class, promotion to a new class, or creation of a new class, are among management's limited response options.

Some city and county governments are gradually moving to salary structures with wider ranges of pay and fewer, if any, longevity steps: "This change provides more salary management flexibility and reduces the entitlement mentality associated with longevity step increases." Other cities, such as Long Beach and San Diego, are contracting out for many IT job skills, facilitating competitive pay and recruitment.

Once in a job classification, state employees can receive pay increases by moving to different "steps" in the class. This requires obtaining a good performance rating during the performance review period, usually a year. Most employees receive a satisfactory rating and move up the step. At some point a person will complete the entire range of step pay increases available within a given class. Additional pay increases (beyond cost of living increases) require promotion to the next higher class. The person must be tested and placed on a "list" to be "eligible" for promotion to the higher class.

In many of the technical classes, employees reach the top quickly. In order to advance to a higher salary level, they need to pursue a supervisory position. However many technical employees do not want to be supervisors, as they enjoy the "hands on" aspect of the job. Moving into supervisory positions can mean removing oneself from working on a project, often the aspect that interests these employees in the first place. In addition, employees who move into a supervisory position are often not compensated for "overtime" work, as are the "technical" classes.

In a recent *InformationWeek* article, an IT employee sought advice regarding whether to move into management for a salary increase: "My employer has told me that I have to move into management to get a significant increase in salary. I think such a move would be a mistake for both me and my employer, even though I have a lead position in the IS department and unofficially supervise other staff. How can I convince my employer that I shouldn't be penalized salary-wise for remaining on the technical side?" The advice was "if there's no other way to get salary increases, leave. There are other companies that offer a 'dual career' path and reward those moving up the technical ladder." <sup>68</sup>

Table 9								
IT Salaries for California State Government								
Information Technology Class Information February, 1999	Type Salley Reduce	Que Trace	The Control of the Co	The True	ST CONTROL OF STATE O	THE	de Class	india de la constante de la co
1360 Information Systems Technician	\$1,934 - \$2,094	363	4	22	23	4	1972	
1562 Information Systems Technician Specialist I	2,725 - 3,275	122	2	29	4	1	1972	
1557 Information Systems Technician Specialist II	3,275 - 3,949	37	0	13	2	0	1972	
1408 Information Systems Technician Supervisor I	2,947 - 3,542	24	0	13	1	0	1972	
1407 Information Systems Technician Supervisor II	3,542 - 4,271	16	0	2	0	0	1972	
1479 Assistant Information Systems Analyst	2,423 - 2,611	496	3	67	33	1	1975	
1470 Associate Information Systems Analyst (Specialist)	3,602 - 4,346	1476	29	169	86	3	1975	
1471 Associate Information Systems Analyst (Supervisor)	3,710 - 4,476	33	1	1	1	0	1975	
1337 Senior Information Systems Analyst (Specialist)	4,139 - 4994	70	1	25	10	0	1975	
1340 Senior Information Systems Analyst (Supervisor)	4,476 - 5,401	26	0	3	3	0	1975	
1312 Staff Information Systems Analyst (Specialist)	3,770 - 4,547	321	4	134	21	0	1975	
1316 Staff Information Systems Analyst (Supervisor)	4,077 - 4,918	51	0	15	1	0	1975	
1579 Associate Programmer Analyst (Specialist)	3,602 - 4,346	909	23	28	62	2	1975	
1580 Associate Programmer Analyst (Supervisor)	3,710 - 4,476	2	0	0	0	0	1975	
1396 Programmer Apprentice 1382 Programmer I	1,900 - 2,054	0	0 17	0 19	0	9	1975 1975	
1383 Programmer II	2,423 - 2,611 2,996 - 3,602	60 87	8	20	4	0		
1583 Senior Programmer Analyst (Specialist)	4,139 - 4,994	67	0	19	4	0	1975	
1584 Senior Programmer Analyst (Supervisor)	4,476 - 5,401	45	0	10	1	0	1975	
1581 Staff Programmer Analyst (Specialist) 1582 Staff Programmer	3,770 - 4,547	301	0	90	26	0	1975	
Analyst (Supervisor)  1381 Data Processing Manager I	4,077 - 4,918 4,077 - 4,918	40 153	0	6 22	1 7	0	1975 1968	
1384 Data Processing Manager II	4,476 - 5,401	153	0	41	12	0	1968	
1393 Data Processing Manager III	5,441 - 5,999	101	1	23	12	0	1968	
1387 Data Processing Manager IV	5,982 - 6,596	4	0	2	0	0	1968	
TOTALS Source: SPB IT Job Specifications		4957	94	761	318	20		

State employee salary increases are typically approved as a total dollar amount, with the same percentage increase given to all eligible employees. The "pot of funds for salary increases" is then "bargained" among the various collective bargaining units. It is very difficult for a collective bargaining unit to bargain for higher salary increases for only part of its members. Consequently, even though IT employees might require a larger pay increase as a recruitment or retention strategy, because they are in a unit with other state employees, the likelihood is that they will get the same salary increase as the other members of the collective bargaining unit. No salary increases were provided to the majority of state employees, including IT employees, from January 1995, to April 1999. State civil service-wide increases of 5.5 percent were effective April 1, 1999. However, the cost of living has risen by more than ten percent since 1995.

Employees can advance to a higher salary level by promoting to a higher class. This often involves taking a test to be eligible to promote. Once the employee passes the exam and is eligible, a job position or opening has to become available at that level in order to promote. For example, a position originally budgeted or approved as an Information Systems Technician might have to be "upgraded" or approved at the higher job classification level by the department's personnel unit and DPA, before an employee could promote into a higher class. Upgrading to a supervisor classification would be a lot more involved. Not only would it require approval of the department's personnel shop and the Department of Personnel Administration, but also the Department of Finance in some instances. Each of these approvals is time-consuming and thus a costly step.

IT managers contend that they are losing their staff to higher paying private sector competitors. However, there is no clear data to validate the managers' assertions. State managers and personnel staff generally do not conduct exit interviews. Without information about why people leave, it is difficult to confirm the anecdotal stories of employees leaving to the private sector for higher salaries. In fact, IT Task Force data suggest that many IT employees are recruited by other departments, creating a chain of vacancies. Nonetheless, IT Task Force survey respondents agree that "lack of competitive pay" is a major reason for state IT job vacancies.

Government surveys that compare private sector and state pay by broad occupations generally find that state IT employees receive much lower pay than their private sector counterparts (see Table 10 on the next page). Department of Personnel Administration staff note that it is difficult to measure the gap between IT pay in the public and private sectors, as the jobs are not always comparable. This is primarily because state job classifications do not correspond to private job functions. California companies frequently contract for IT salary comparisons, and a number of firms specialize in providing that data. In order to be useful, public-private salary comparisons should compare salaries and benefit packages.

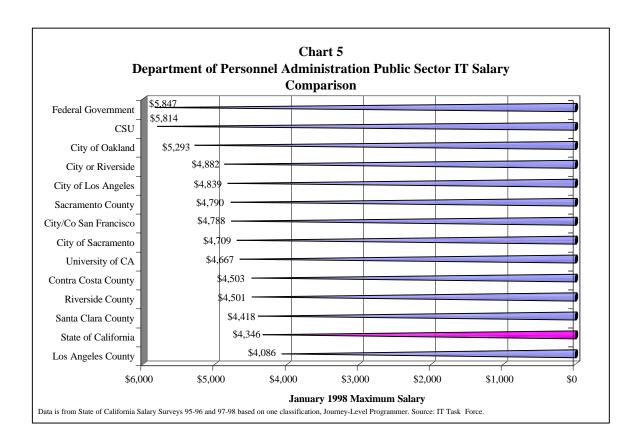
<sup>§§§</sup> DPA is developing a general exit interview format for all state managers.

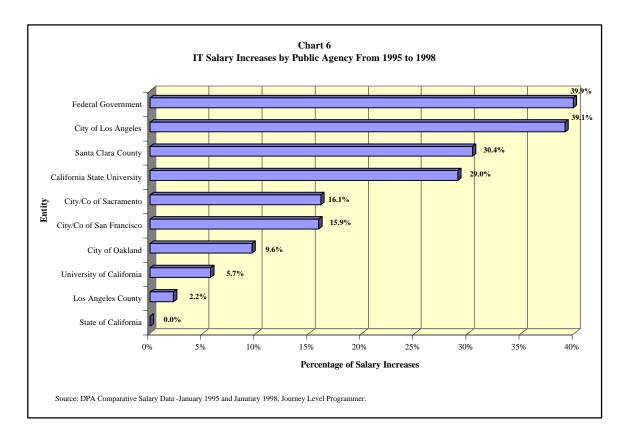
Table 10	Table 10
Salary Comparison: Public Sector vs. Private Sector	Comparison: Public Sector vs. Private Sector

Employer	Entry* Hire Rate (Average)	Journey** Average Salary		
State of California	\$2,369	\$4,178		
Private Sector	\$3,487	\$5,113		

<sup>\*</sup>Entry Level Job Classifications: Programmer I (Range A); Assistant Information Systems Analyst (Range A)
\*\*Journey Level Job Classifications: Associate Programmer Analyst; Associate Information Systems Analyst
Source: DPA 1998-99 Salary Survey

State of California IT salaries are also low relative to other public agencies, as Chart 5 shows. State IT salaries have fallen behind over the last four years (Chart 6, on the following page), even allowing for the recent 5.5 percent increase.





## Performance Bonuses

State managers do not have the flexibility to offer "hire" or "promotion" bonuses to recruit or retain valued employees. They can, however, "hire above the minimum" salary with the approval of their personnel office. This request may be approved if the manager can demonstrate that the prospective employee would not accept the job without that higher salary level, and is already making more money in the private sector. These requirements are a "Catch 22," as people already making more money in the private sector generally do not apply for the state jobs.

In contrast, private employers have the financial flexibility to offer higher salaries to attract individuals with certain high demand IT skills. Private employers often include bonuses, profit sharing and other benefit packages to recruit skilled workers in high demand areas, as discussed above.

Federal agencies can grant lump-sum cash awards in the amount of ten to twenty percent of salary, or a maximum of \$10,000, for accomplishments that contribute to the "efficiency, economy or other improvements in government operations." These performance awards do not increase an employee's base salary.

State employees are eligible for the following major benefits:

- Health, dental and vision care insurance for employees and eligible dependents.
- FlexElect reimbursement accounts to help pay for out-of-pocket dependent care and medical expenses with pre-tax dollars deducted from monthly pay warrants.
- Employee Assistance Program; services that provide confidential assessment, short-term counseling and referral to employees, their families, and supervisors dealing with behavioral/personal problems.
- Vacation; the number of hours an employee can earn depends upon the time-base, bargaining unit agreement, and the length of State employment.
- Sick Leave; the number of hours an employee can earn depends upon the timebase and the bargaining unit agreement.
- Holidays; state employees are entitled to receive pay for the 12 state holidays and a Personal Holiday during the year.
- Bereavement Leave; State employees are allowed paid time off (three to five days) if a member of their family dies.
- Military Leave; an employee may take up to 30 calendar days with pay for military leave each year if the employee meets certain requirements.
- Jury Duty; if a state employee is called on jury duty, the employee serves with no loss in pay as long as the employee remits to the state any fees received for jury duty.
- Family, Parental and Other Leave; employees are eligible for unpaid leave of absence of up to one year under certain situations.

## **Other States—Compensation**

#### Kansas

Kansas, like many other states, is experiencing a high turnover of its IT staff; in some agencies the turnover rate has exceeded 33 percent. In response, the Kansas Department of Administration developed an Information Technology Employee Retention Program which features the following enhanced compensation bonuses:

- Bonuses for mission-critical, market-sensitive IT skills;
- Project bonuses up to ten percent of an employee's base salary for meeting goals on mission-critical projects;
- A hiring bonus of \$3,000 to recruit individuals with market-sensitive skills, and \$500 to recruit others computer workers.

## Missouri

The State of Missouri lost more than 100 computer specialists, or about a tenth of its employees in that job category, over a two year period. To address this IT retention problem, Missouri established an IT Task Force composed of the 17 state agencies. The task force proposed a salary increase for computer specialists of 24 percent to 50 percent. However, because of a revenue shortfall the legislature did not approve the proposal.

Missouri has reduced the state's 17 IT job classifications to nine IT job classifications. These classifications have broader pay steps and provide both technical and managerial career tracks.

## Texas

Texas state government, like other state governments, is losing IT employees to private high-tech companies, especially in the Austin area. According to the Greater Austin Chamber of Commerce, there are over 770 high-tech companies with more than 67,000 employees in the Austin area.

- In 1997 the Texas Legislature revised the state's information technology job classifications to broaden the pay scales. State agencies were provided the flexibility to move employees within the new pay scales. However, they had to come up with the additional funds to pay the additional salary increases.
- Bonuses in the amount of \$5,000 per year, per employee, for up to two years were authorized by the legislature for high-tech workers working on Y2K projects. The bonuses will only be paid for employees who stay on until May 31, 2000. The turnover rate has been reduced by approximately 30 percent in one agency and 12 percent in another.

## Massachusetts

Massachusetts state agencies compete for IT staff with the "Route 128" area. This 30 mile circumference of Boston contains many private software/hardware firms as well as large companies like Polaroid that have substantial IT departments.

To address its retention problem, the state of Massachusetts enacted a "Technical Pay Law" in the early 1980's which allowed the Personnel Administrator to designate certain state professional-level IT positions exempt from the pay prescribed by state employee collective bargaining contracts. The exempt employees are paid from a salary schedule that is more reflective of the current labor market. The salary schedule is issued by the Personnel Administrator and involves the use of broad pay bands, based upon findings from a current salary survey. Currently two salary surveys are conducted during the year, one in the fall and one in the spring.

#### North Carolina

North Carolina's state government competes with the private sector for IT employees. Just several miles from the State Capitol is a "Research Triangle Park" that houses a large IBM center, SAS Institute, and a number of other large and small IT employers.

To compete with the private sector, North Carolina has instituted:

- A scarce skills salary differential of 10 percent,
- A program to give agencies more flexibility to move employees within the salary range as they acquire and apply new skills,
- Special entry rates above the standard salary range minimums for IT classes,
- Authorized retention salary increases when employees get offers from outside state government,
- Sign-on retention and project completion bonuses, and
- Competitive entry salaries for new college graduates and students in an attempt to increase college recruitment.

#### Minnesota

Minnesota consolidated 24 job classifications into five job classifications. Labor relations agreements were negotiated with the labor unions to provide greater flexibility in negotiating salaries.

#### Connecticut

State agencies unable to hire information technology professionals have turned to contract labor to do the job. In the case of Connecticut, the entire state government is pursuing contracting out its IT work.

Connecticut state agencies spend approximately \$200 million per year on information technology. The State's 60 state agency's "systems aren't integrated and they don't work efficiently." For example, "the state has 12 different systems that track the same information on employee work hours and attendance." This and staffing problems prompted Connecticut to negotiate a contract with Electronic Data Systems (EDS) in the spring of 1999 for the provision of Information Technology (IT) services to nearly all of the state executive branch agencies.

## Recruitment

California's state personnel recruitment efforts are extremely decentralized. The State Personnel Board (SPB) has delegated considerable authority to departmental personnel units. This decentralization provides important flexibility to the state's varied operations. Each state department conducts its own recruitment, markets job openings to fill vacancies, administers job examinations and does its own hiring. There is no single list of state job openings.

In order to apply for a state job, an applicant must first qualify to take a civil service exam by filling out a state application. Full-time state civil service jobs are generally filled through competitive examinations, some of which are announced on the SPB website. Lists are also available at SPB's 801 Capitol Mall office, local California

Employment Development Department offices, and the personnel offices of testing departments.

It is very difficult for potential IT job applicants outside of state civil service to find out about job openings and apply for them. Even if the person locates the SPB website, most job openings are not posted on it, and the site is confusing. Not one IT job vacancy is currently listed under "Immediate Openings, Resumes Wanted."\*\*\*\* During a two month period monitored for this report, only two IT vacancies were posted on this screen. Since many qualified IT workers look for jobs over the Internet, the state's weak IT Internet recruitment efforts are a disadvantage.

The SPB is responsible for the selection, recruitment, marketing, and some training for supervisors on how to hire and select employees. However, in practice the State Personnel Board primarily assists departments to recruit for statewide open exams in large entry level job classes such as Staff Services Analyst, Office Assistant, Correctional Officer and Information Systems Analyst. For these classes, the SPB markets and conducts the statewide tests. The Staff Services Analyst and the Information Systems Analyst exams are given over the Internet. For all other job classifications, the SPB provides marketing and recruitment services for state departments if they pay for the service.

According to the SPB staff, in prior years the Board requested resources to provide centralized marketing, recruitment and testing services for IT positions, using the Internet. A portion of the request was approved, to provide centralized testing for a few job classifications. SPB staff asserts that it is more cost effective to provide centralized recruitment and testing for widely used job classifications. It costs \$100,000 to \$300,000 to develop and give a job exam over the Internet, including test development and validation. It costs around \$30,000 for a department to develop and give a job examination. When there is a need to test more often than once a year, as in the case of many IT job classifications, centralized Internet job exams are cost effective and prompt. In addition, all state departments could have access to the list of successful candidates.

Applications to take a civil service exam are submitted to the testing department. Applicants are notified within 30 days that their application has been received and if they meet the "minimum qualifications" specified by the class and are eligible to take the exam. After passing a state civil service exam, an applicant's name is placed on an employment list, which generally remains active for one to four years. Managers seeking to fill jobs review the list of qualified individuals on the appropriate class list and contact them.

Some job classifications can test for applicants by "open" examinations for which anyone can apply. Other classifications are limited to existing state employees and considered "promotional-only" exams. According to personnel officers, the process for open exams can be "enormously costly and time consuming," and they have "neither the resources

...

<sup>\*\*\*\*</sup> The IT jobs that are listed are posted on the "VPOS-Transfer and Reinstatements" screen, as opposed to the more accessible "Jobs Open to the Public" screen.

nor the time" to give open exams. One reason is that so many people apply. As a result state managers often opt for "promotional-only" exams, which limit the pool of candidates to those already in state service. This practice focuses recruitment efforts on "raiding" other departments' valued employee pools. A "churning" takes place as other departments resort to similar recruiting and hiring processes. The IT Task Force survey data found that departments often hire their IT employees from within state service.

The following table, provided by the SPB, describes a proposed process for giving state civil service IT exams over the Internet. This proposal is still under development.

1	e 11				
State Personnel Board Proposed Internet Selection Process for Information					
Technology (IT) Classifications					
as of April 26, 1999					
•					
CURRENT PROCESS	PROPOSED PROCESS				
Computer-based examination via SPB internet	Computer-based examination via SPB internet				
web site for two IT job classifications.	web site.				
Open, Continuous testing for two Associate IT	Open, Continuous testing for all entry through				
job classifications.	staff level IT classifications				
Examination questions focus on information	Examination questions are generic as to the				
technology education, training and experience	specific types of information technology				
for specific operating systems, environments	education, training and experience.				
and software.					
Applicants provide a self-identified inventory					
	of specific IT skills detailing types of systems,				
	environments and software, and their degree of				
	expertise.				
Applicant submits examination responses and	Applicant submits examination and skills				
is issued a PIN number to access exam results	inventory responses, and can wait for scoring				
the following Wednesday after exam.	and issuance of examination results.				
Job/Applicant matches are only available by	Job/Applicant matches are available by use of				
responses to specific questions.	self-identified skills inventory data, which				
	hiring departments can access directly through				
	SPB internet web site.				
	Availability of skills set tests via SPB internet				
	web site, allowing departments to test				
	applicants to verify level of self-identified				
Exam results are downloaded into SPB's on-	skills as part of their hiring process.  Exam results are maintained on SPB internet				
line examination system. Certifications	web site, which Department Personnel/IT				
ordered and issued through on-line system, by	offices can access directly to certify names of				
Department's Personnel Office, with 24 hour	eligible candidates that match specified skill				
turnaround time.	sets.				
Source: State Personnel Board, April 26, 1999.	Deta.				

Many businesses pay recruitment bonuses as an inducement to persuade skilled IT workers to take their jobs. The federal government grants its agencies the authority to

make a lump-sum payment of up to 25 percent of basic pay to a newly appointed IT employee.<sup>70</sup>

## **Marketing**

State departments do very little marketing to attract outside IT job candidates. This is partly due to the cost of advertising or attending events. Many IT job fair events cost \$3,000 to \$8,000 to attend. It is not cost effective for individual departments to go and recruit for one or two positions. Most state departments do not even attend University of



California, Davis, or Sacramento State (CSUS) recruitment events.

College students are a great potential source of IT talent, as they are often conversant with current IT technologies and have a good general educational background. They are also in high demand in today's hot IT job market. Recruitment must be active and on-site to be successful.

University campuses have many programs to help their students with employment opportunities. For example, California State University at Sacramento has a career library which offers job announcements, career information by industry, company videotapes, business newspapers, sample resume binder, college/university catalogs, and graduate school information. It sponsors career information days in February, April, and October, in which employers can recruit students. There are also on-campus interviews; whereby employers can schedule days to interview interested candidates. According to California State University at Sacramento staff, no state departments have recently participated in campus recruiting activities.

California businesses and many public agencies market their IT jobs over the Internet, which may be the most effective recruiting medium for reaching technical workers. According to a recent study by Pacific Bell, an estimated 80 percent of college graduates will use the Internet to find and apply for a job this year. However only two of the departmental websites reviewed for this report advertised IT job openings, the Franchise Tax Board and the Department of Corrections. None of the following departments advertised their IT job openings on their websites: the Employment Development Department, the Department of Motor Vehicles, CalTrans, General Services, Department of Developmental Department, Department of Health Services, Department of Water Resources, Department of Mental Health, and Department of Industrial Relations.

Departments could list their T jobs on the SPB website. However most do not; "We only send the job announcements to all departmental personnel officers and *Capitol Weekly*." *The Capitol Weekly*, a local California State Government newspaper, publishes state agency job advertisements. However, it is primarily circulated to state departments and to the general public at only a few newsstands.

The IT Task Force survey found that many state IT managers believe that their personnel staff and IT shops often communicate very poorly. Our interviews suggest that some departmental personnel staff do not understand IT needs well. Another indication of this is that very few departments have undertaken effective IT recruitment efforts. Exceptions include the Franchise Tax Board, which advertised and interviewed in the Silicon Valley, and the Department of Industrial Relations, which advertised in San Francisco newspapers. Both efforts met with limited response. One reason may be the state's complex, lengthy and bifurcated exam and job application procedures. Promising IT candidates expect quick job offers.

There are a number of exciting challenges about state IT work that could attract good candidates: large, complex projects with important public impact, interesting and significant work, good benefits and job tenure. However most departments have not created marketing materials that could be used to recruit IT candidates. The level of marketing sophistication for recruitment and hiring varies considerably from department to department. Some state agencies, such as CalTrans, have created marketing brochures, and others have not. Personnel staffs contend that they are often so busy with the daily "busy work" of testing for numerous classes and interviewing job applicants that they do not have time to develop marketing materials.

## State Personnel Board Informational Hearing on IT Recruitment and Retention

On July 1, 1998, the State Personnel Board conducted an informational hearing on:

- The IT recruitment and retention experience of state departments;
- Approaches that the State of California, as an employer, can employ to attract and retain IT professionals; and
- Innovative IT recruitment and retention strategies used by other public and private sector employers.

Representatives from firms specializing in the recruitment of IT professionals provided the following innovative strategies for the state to consider:

• When interviewing a candidate for an IT position, an organization must have the ability to make a job offer "on the spot" or they will lose the candidate to another employer. In contrast, it takes 60 to 150 days for the state to complete a hiring process. Some managers reported as long as six to ten months to complete a job hire.

- Contract IT employees can be used to train and develop existing employees rather than using these contractors solely to complete all of the interesting and critical assignments.
- The state could hire students from formal IT academic programs and offer them
  monetary incentives to become permanent employees upon graduation.
  However, pay scales and difficulties in meeting the civil service minimum
  educational qualifications impede the hiring of students.
- When hiring, the state could match a candidate's unique skills and expertise to the
  particular requirements of the project. This would require more up-to-date job
  classifications.
- The most effective way to locate qualified applicants is to pay existing employees for referrals of IT professionals. This would require introducing the issue of bonuses into the collective bargaining process.
- The state could develop its ability to effectively use the World Wide Web to advertise IT jobs. IT professionals tend to make full use of that technology.
- State IT salaries should be more competitive. 71

Hearing participants suggested that the state develop an IT testing process that would allow for "job offers on the spot." It was suggested that the State "place greater emphasis on recruiting IT professionals directly out of college, offer more open-continuous exams and conduct more Internet testing." In addition, the SPB might conduct all IT testing in order to achieve greater efficiency and effectiveness in the testing process.<sup>72</sup>

Representatives from several public universities suggested that the State publicize "the (job) stability of state government as well as its meaningful projects, many of which have a positive impact on lives of the citizens of California." Other participants suggested publicizing the benefits of working for state government, the responsibility associated with various state IT projects, and their important public impact.<sup>73</sup>

According to hearing participants, surveys report that differences in wages, promotion, and personal growth opportunities between the state and private sector are a deterrent to state IT recruitment and retention. For example, many recent college graduates feel that the private sector offers better career opportunities than the state. Pay differences are routinely cited as a reason why recent college graduates are not interested in pursuing work in the public sector.<sup>74</sup> The state has a particularly difficult time trying to compete with the salaries offered by high tech companies located in and around the Silicon Valley. State departments with offices in the San Francisco area are particularly affected. The state does offer flexible working conditions such as alternate workweeks, telecommuting and flex-time. However these programs are also available in the private sector and therefore are not considered an advantage over private industry.

Hearing participants contended that the state's IT recruitment efforts are very passive. Obstacles include complex bureaucratic procedures and long delays in notifying applicants about job offers. Testimony commented that the state's IT retention problem is resulting in a significant loss of the departments' critical knowledge base.

Private sector firms often take a very aggressive role in recruiting. They use professional recruiting firms and advertise in newspapers, IT magazines, and over the Internet. They attend job fairs and participate in campus recruiting events. Some companies even resort to using blimps to fly over competitor companies to advertise that they are recruiting.

Another recent trend is to recruit through temporary staffing agencies that specialize in IT workers. This type of hiring arrangement provides flexibility for the employee and the employer. An employee with high demand skills can work on "contract" basis for a particular project, and can demand what the market will bear. In a tight IT labor market, the IT worker might command higher salaries for each project.

## Filling a State IT Job Vacancy

In order to better clarify this cumbersome process, the following discussion describes the process by which one state manager has attempted to fill an IT vacancy. The manager needs an employee who has the following skills to create a content-rich website:

- Basic html programming,
- Supervisorial abilities to supervise students,
- Budget management,
- Project management and planning,
- Knowledge of state purchasing procedures,
- Ability to review and select appropriate technologies (software and hardware),
- Independent research and organizational skills (library skills),
- Partnership building skills,
- Ability to make presentations to audiences with various technical backgrounds, and
- Ability to analyze the needs of different client groups to determine proper delivery of information to them.

The project manager examines the many state IT job classifications, but none describes the skills and knowledge needed for Internet-based projects. (The Internet did not exist in 1970's when state IT classifications were first developed.) In addition, the technical tools (hardware and software) are likely to change during the scope of the project, requiring considerable agility and learning ability.

The manager approaches her department's personnel office. They suggest recruiting an "Associate Governmental Analyst," a generalist classification, from within state service (a promotional exam). After advertising the position, the manager reviews dozens of resumes but identifies no qualified candidates. She next considers giving an "open test" to recruit IT candidates from outside of state service. The personnel office warns her that

hundreds of applicants might apply, adding time and cost to the screening and testing process. Furthermore, not all IT classifications are open to the general public. Some are available only for state employees for promotional testing. She reviews the various IT classes specifications, but they fail to describe the work required for the project. The choice of job class seems arbitrary but necessary. For example,

- The Information Systems Technician series is described as performing "a variety
  of technical duties in support of the operation of electronic information processing
  systems, such as data processing systems, microcomputers, multifunction
  automated office systems, and teleprocessing networks or systems; and to
  supervise others in the performance of information processing activities and
  related technical tasks."
- The Assistant Information Systems Analyst series performs "a variety of analytical activities in support of electronic information processing systems, such as data processing systems, microcomputers, multifunction automated office systems, and teleprocessing networks and/or systems. Incumbents develop problem solutions using information technology methods; conduct feasibility studies; act as project managers over electronic information processing projects; work on analysis and support of multifunction office systems; provide information center services and electronic information processing services."
- The Programmer series includes the following responsibilities: "plan and develop programs to be processed by electronic information processing equipment; under close supervision, to perform systems analysis or systems programming (software) work; and to do other related work."
- The Programmer Analyst series also encompasses some of the required skills: "develop methods of applying computer technology to the solution of problems; to develop and implement complex programs to achieve desired results; to act as leadperson or supervisor over technical personnel; and to do other related work."

Hundreds of job applicants take and pass the "open" exam, but only a few have the necessary skills. After a week and a half of interviews, it is evident that none of the applicants meet the job requirements. This is perhaps not surprising, given the high salaries that skilled Internet technical experts can command in the private sector.

The manager is concerned about the amount of time this process has consumed, as it is well into the budget year. She resorts to aggressive recruiting from other state agencies and identifies and finds a person with the needed skills. However, she hires the employee in a non-IT class because the person does not qualify for the IT class specified in the recruitment efforts.

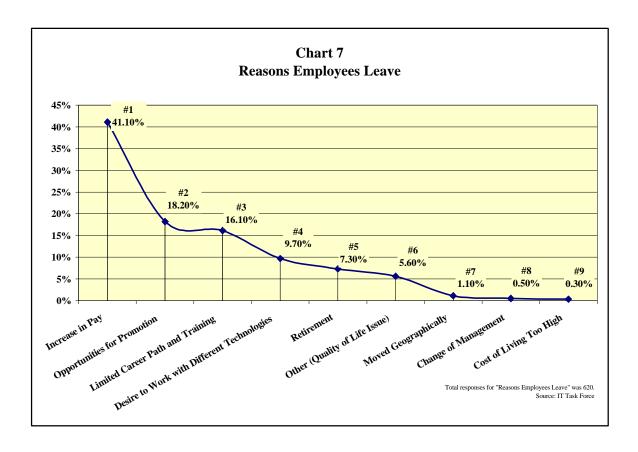
This entire recruitment effort took about six months. Another manager interviewed for this report is in the process of giving a second civil service exam, without much hope of finding the right candidate. According to a survey conducted by the IT Task Force, the average number of days to fill a vacant state IT position ranges from 60 to 150 days.

## Retention

Like many other public entities, California is seeking to find ways to retain its valued IT workers in light of lower state salaries, highly competitive private sector opportunities and cumbersome civil service testing and hiring practices. Nonetheless, the state has no active program to foster retention of its IT employees.

According to the state IT Task Force survey, more competitive salaries would help retain IT employees. Equitable base pay was ranked as by far the most important retention issue, as shown below. Other retention issues included management style (less hierarchical and more "employee-centric"), promotional opportunities, flexible compensation such as bonuses and other benefits, and working in interesting program areas.

Table 12 State Workforce Retention Issues by Degree of Importance				
Category	Ranking			
Equitable Base Pay	1			
Employee-Centric Management	2			
Promotional Opportunities	3			
Flexible Compensation (e.g. Bonus & Benefits)	4			
Interesting Program Area	5			
Clear Leadership & Strategic Direction	6			
State of the Art Technology	7			
Adequate Staffing	8			
Quality of Work Environment	9			
Regular & Open Communication	10			
Recognition	11			
Training and Learning	12			
Location	13			
Department's Reputation for Success	14			
Source: IT Task Force 1998.				



At the State Personnel Board recruitment and retention hearings on July 1, 1998, representatives who testified suggested:

- Provide longevity pay, retention agreements, bonuses, and monetary awards; and
- Use mentors and coaches to motivate, develop and train existing employees as they move into IT positions.

A recent survey by the Council of Communication Management found that "recognition for a job well done is the top motivator of employee performance." There are a number of practices that managers can institute to increase the probability that an employee will remain committed to an organization. Some workers are motivated by money, others by promotion, others by challenging assignments, and others by acknowledgement and appreciation. Finding the right motivator to recognize and reward employees is key to building a strong team. Building a strong team can make employees content enough to reject competitive job offers (although at a salary differential of more than 15 percent, many employees will leave).

State managers have fewer ways to monetarily reward employees, so consequently other forms of recognition play a more critical role. Numerous studies have confirmed that "while money is important to employees, what tends to motivate them to perform, and to perform at higher levels, is the thoughtful, personal kind of recognition that signifies true appreciation for a job well done." Many highly effective forms of recognition cost

nothing. They can range from, a mere "thank-you," "you did a good job" to publicly recognizing employees for a good performance. Managers need to create work environments that are both positive and reinforcing. "The secret here is to keep people from getting into the [job-seeking] game."

The following are some retention incentives often used in the private sector:

- 1. Flexible hours and telecommuting. Many IT executives say flexible hours and telecommuting are among their most effective low-cost incentives.
- 2. Praise. "Praise by a manager still works wonders." <sup>78</sup>
- 3. Training.
- 4. Clear career paths. The absence of a clear-cut understanding of what people have to do to advance creates problems in retaining people.
- 5. Work with cutting-edge technology.
- 6. Value of benefits package.
- 7. Supportive culture that pays attention to employees' needs.
- 8. Small gifts and cash prizes. Small gifts such as sports tickets, free meals, or onthe-spot cash awards of \$50 are useful as a way to recognize employees' accomplishments.<sup>79</sup>

Other states are experimenting with bonuses as retention incentives. Some examples are discussed in "Other States—Compensation" beginning on page 44. The federal government provides its agencies with the discretionary authority to make continuing payments of up to 25 percent of basic pay to individual IT employees, and of up to ten percent of basic pay to a group or category of IT employees, for retention purposes.

## Training

Training is especially important in IT, as new hardware, software and business applications are constantly developing. Skills can become outdated quickly, although "legacy" skills for the state's older systems remain important. In addition, training is an expected and important retention tool for IT workers, who highly value continuous learning. The



bottom line is that "States that scrimp on technology training find that many of their workers just don't have the skills to do their jobs." According to George White, Director of Pennsylvania's Bureau of Desktop Technology, "We have to constantly keep people's skills updated."

The Continuous Improvement Division of California's Department of Personnel Administration is responsible for managing "state training, education and quality consulting programs." Training for state IT employees is offered through three different providers:

- The State Training Center offers general training for state employees, primarily "soft skills" such as legislative and analysis. The DPA recently assumed responsibility for the Training Center and plans to expand its offerings.
- The Learning Institute (through a contract with Comp-USA) offers a wide variety of standard IT applications training at 29 statewide sites, such as Novell Certification and Microsoft Certification. The Learning Institute offers courses taught by instructors, by CD-ROM and over the Internet.
- The Health and Welfare Data Center (HWDC) offers more advanced technical training (specializes in mainframe-level skills).

Employees can request training that is not offered by these providers and is needed to do their job, on a case by case basis.

Representatives from State departments who provided testimony at the July 1, 1998, SPB informational hearing, acknowledged that "IT training was crucial in order to maintain pace with the technological advances in the field." They also contended that state "training budgets were inadequate to maintain the level of skills required by current IT projects."

Training funds are budgeted as part of a department's operating expense and equipment line item. Included in this lump sum amount are numerous other operating expenses such as general expense, printing, communications, postage, insurance, travel, facilities operations, utilities, consulting and professional services, consolidated data center services, data processing, central administrative services, equipment, vehicle operations and training. State agencies often use training funds and general expenses to cover "other needs" that may come up unexpectedly. Consequently training dollars are frequently used for activities other than the training needs of the organization and its employees.

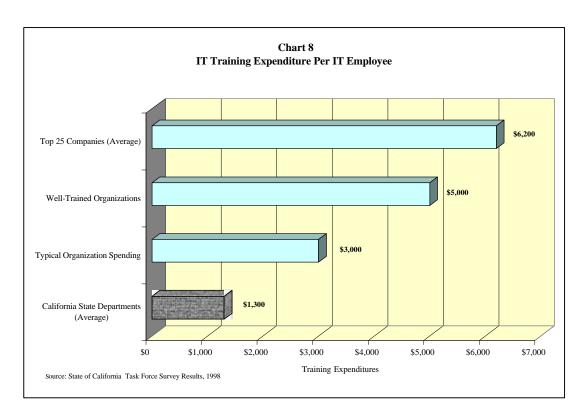
The state's average IT training expenditure is about \$1,250 per IT employee, but the amount varies considerably by department. This average training expenditure falls short of the IT training needs of most departments, considering that it may cost from \$3,000 to \$5,000 or more for a week of IT training. Table 13 below summarizes the training expenditures of the 25 departments surveyed by the IT Task Force. Some departments spend as little as \$500 per IT employee and some as much as \$2,500.

The Employment Development Department has a creative project underway in which it tests willing current employees for their potential IT aptitude, using a test also administered by NASA. Of the 300 employees that took the test, ten are completing extended IT training and are performing well, according to department managers. Since these employees already have made a substantial career investment in EDD, the hope is that they will remain in the department.

Table 13 State Agencies Average Training Expenditure per IT Employee (1997/1998 Fiscal Year)								
\$0	\$500	\$750	\$1,000	\$1,250	\$1,500	\$1,750	\$2,000	\$2,500
to	to	to	to	to	to	to	to	&
\$500	\$750	\$1,000	\$1,250	\$1,500	\$1,750	\$2,000	\$2,500	greater
8.0%	4.0%	12.0%	24.0%	16.0%	4.0%	16.0%	4.0%	12.0%
Source: IT	Task Force S	urvev. 1998.						

Three quarters of the respondents to the IT Task Force Survey indicated that the amount of IT training provided by their departments is inadequate. The shortfall is particularly acute in the area of new technology training. Most respondents agreed that the availability and convenience of training vendors in the core technologies is adequate.

As a follow-up to the IT Task Force survey, we interviewed officials in a number of the departments which responded to the survey. None had formally requested an increase to their training budgets. IT managers contended that their management had not supported a request to increase training funds because the Department of Finance would not entertain such a request. Interviews with staff at Department of Finance indicate that requests to increase the baseline for "training" are typically not approved, but such requests could be approved if departments "made their case that an increase in training dollars was critical to the success of their IT projects." Departments also need to justify that funding in their budgets is not already available to redirect for training purposes.



Training can be a double-edged sword: while it may provide employees with the additional skills needed to do their jobs, it may also make them more attractive to higher paying private employers. For example, the city of Chicago lost 75 percent of its newly trained employees on Oracle databases in less than a year. Recognizing this problem, the federal Office of Personnel Management (OPM) enacted regulations requiring employees who receive extensive training to sign service agreements to remain with the department for a specified period of time. According to our interviews, some private companies also require a minimum commitment in return for training, while others are unsure as to the legality of such contracts.

Given the high demand for skilled IT workers, and the possibility of enticing offers by competitors, loyalty and retention strategies assume a larger role in management strategies. According to Interim Career Consulting, "The definition of loyalty has shifted from: how long you stay with one employer to what you accomplish while there. In return employees expect opportunities for personal growth, on the job training and mentoring to increase skills and remain marketable." <sup>84</sup>

All the private employers interviewed for this report noted that training is not only provided but required of their employees. Equally important is that employees know that if they do not keep up with the skills needed by the company, they will not remain employed. Most employers mentioned that three weeks of training a year is a minimum expectation, while others generally suggest a range of three to five weeks. Table 14 lists 25 companies, the average number of days IT staff spend on training, and the average cost of training per IT employee.

Table 14

Computerworld's 1998 - 25 Leading Corporate Information Systems Training Programs

Company	Average Days IT Staff Spends in Training	Average Costs of Training per IT Staffer	Percentage of IT Staff with Annual Training Plan
The Home Depot, Inc.	15-20	\$6,000	100%
Bay Networks, Inc.	>20	\$20,000	100%
Computer Associates Int'l., Inc.	15-20	\$18,000	100%
Tech Data Corp.	>20	\$15,000	100%
Sallie Mae	>20	\$4,000	100%
Xerox Corp.	10-12	\$11,000	100%
Sears, Roebuck and Co.	10-12	\$7,875	100%
Union Camp Corp.	15-20	\$3,500	100%
American Management Systems	10-12	\$4,500	100%
EMC Corp.	13-15	\$5,000	100%
Wal-Mart Stores, Inc.	>20	\$4,000	100%
Johnson Controls, Inc.	13-15	\$3,000	100%
Coors Brewing Co.	13-15	\$8,000	100%
Norrell Corp.	13-15	\$4,000	100%
Springs Industries, Inc.	10-12	\$2,000	90%
Solectron Corp.	15-20	\$3,000	100%
AMP, Inc.	10-12	\$3,500	100%
Rykoff Sexton, Inc.	10-12	\$8,000	100%
3Com.Corp.	13-15	\$2,000	100%
Avnet, Inc.	>20	\$1,000	100%
Honeywell, Inc.	13-15	\$2,500	95%
Standard Insurance Co.	10-12	\$2,000	100%
Texas Instruments, Inc.	10-12	\$3,000	100%
Pacific Health Systems	10-12	\$3,000	100%
Consolidated Stores Corp.	10-12	\$10,000	100%
•	10-12	\$10,000	10

Given limited training funds, some state agencies are turning to internal forms of training: team learning, mentoring and cross training are widely used techniques. However, agencies are limited to the extent that they can spare the time and staff to provide the mentoring and cross training. Another mechanism of developing additional skills is through job rotation. To be effective, this requires a clear career development plan. However, the IT Task Force survey found deficiencies in career development planning for IT employees, as performance reviews often are not completed.

Some states are still using traditional, instructor-led classroom IT learning methods, whereas others are moving toward self-directed instruction. Self-instruction typically involves computer-based software training programs provided over an Intranet, or World Wide Web-based training. For example, Pennsylvania uses Web-based training to train a large number of people in diverse topics in a very short period of time. Pennsylvania's web-based training program delivers 185 course titles over the state's Intranet system.

After the start up costs, the Intranet costs about \$100,000 a year. Evaluations have been positive.

Intranet or web-based training is very cost effective. There are no travel costs, and employees are not away from their families or jobs. In addition, the training can be taken any time and at an employee's own pace. A skill assessment component is a key feature of many computer-based training programs. Usually a pre-test is administered to identify what workers already know and instruction is focused on the skills needed. A post-test is administered to determine whether the worker has absorbed the new material.

Washington State offers more than 100 courses to provide technology training over its Intranet, and also provides CD-ROM courses for employees not connected to the computer system. The courses range from very technical subjects to desktop applications. The cost is about \$67 per course.

In Idaho, training was identified as critical to recruiting and retaining employees. A survey found that one of the top three reasons people left their state job was "lack of training." Under a new plan, university-level training and information technology professionals will be made available to employees. Training options include 30 classes at colleges and private training institutions in database development, client-server compatibility and desktop computer applications. The classes allow employees to increase their knowledge so they can transition to other state jobs or do better in their current position.

Maryland has created an IT scholarship program and modified its incumbent worker training program to meet the increased demand for IT workers. Two new initiatives, the Maryland Applied Information Technology Initiative (MAITI) and the Science and Technology Scholarship program, aim to increase the supply of qualified IT college graduates. MAITI is a consortium of higher education institutions that seek to increase industry participation in IT curriculum design and expand IT partnerships between the participating schools and businesses. The Science and Technology Scholarship program, scheduled to begin in the 1999/2000 academic year, will provide scholarships to recent eligible high school graduates who enroll in designated science and technology programs. Once participants complete their associate or baccalaureate-level studies, scholarship recipients will be required to work in Maryland for one year for every year they received the scholarship.

Maryland also established Advanced Technology Centers (ATCs) in 1996 within the Maryland community college system. "ATCs strive to increase and improve the skills of the existing workforce by providing customized training to meet regional workforce needs. ATC training covers a broad range of industries. However, officials estimate that about 70 percent of the training has been in the IT area. "In the past two years, ATCs have developed and delivered industry-specific, customized training to more than 650 companies and 29,000 workers." 85

In Missouri, employers in the Jefferson City Capitol area established the Information Technology Coalition (ITC) in 1996 to address a common problem: attracting and retaining qualified IT professionals. "The coalition began as a cooperative effort between GTE Data Services, Central Bank and the State of Missouri to explore possible solutions." The coalition now has over 20 partners. The ITC defines its mission as: "to serve as a central clearinghouse for ongoing communication and partnerships with business and education to promote and encourage people to enter the information technology career field." The ITC's goal is an increased pool of qualified information technology candidates for Jefferson City area employers. Its overall objectives are to:

- Promote information technology careers in the Jefferson City area,
- Encourage interaction between schools and businesses, and
- Promote Jefferson City as a resource base for technical employers.

Ongoing initiatives to support these objectives include:

- A five minute video for secondary education students.
- Underwriting the cost of the aptitude tests to encourage people to enter the computer technology field.
- Education fairs to promote the availability of computer technology positions in Jefferson City.
- IT classes in the evening are taught by local employers.
- A COBOL fast-track pilot program that consists of an intensive twelve-week curriculum designed around a mainframe-computing environment and taught by one of the ITC higher education members.
- A select committee researching how to best prepare people for IT careers, and identifying best practices of recruitment and retention.
- A "return on investment" program that tracks the effectiveness of the coalition's efforts.
- A publicity campaign and education fair, including public service announcements shown by the local television stations, radio and newspaper advertising and local talk show interviews.<sup>87</sup>

The federal government has a Student Educational Employment Program that allows agencies to hire undergraduate and graduate students who are enrolled at an accredited institution. An agency may pay for college courses that improve the performance of students hired under the program. In return, the agency may require a student to sign a service agreement for a specified time commitment with the agency.

## **OPTIONS**

## **General Comments**

State government is a large and complex enterprise similar to an economic cluster—a "geographic concentration of interconnected companies and institutions in a particular field." If the state operated as a cluster of departments with common interests in a highly qualified and well trained IT workforce, it could benefit from the combined power and efficiencies of group marketing, recruitment, exams and training, without sacrificing the benefits of decentralized decision-making. Clustering also offers opportunities for increased productivity and accelerated innovation. As Michael Porter of Harvard points out, "A cluster allows each member to benefit *as if* it had greater scale or as *if it* had joined with others formally—without requiring it to sacrifice its flexibility." "89

Instead, each state department operates its own IT personnel system, yet at the same time is highly constrained by centralized control policies established by the Department of Personnel Administration (DPA) and the State Personnel Board (SPB). (Department personnel rules are sometimes more rigid than formally required, following unwritten "practices.") Business analysts recommend shifting to a "human resources management" approach that adds value to an organization by emphasizing the following key goals: competence, growth, equity, flexibility, diversity and accountability. The idea is to move from paper processing to being a partner, consultant and change agent. What might it take to achieve that change? The Little Hoover Commission, having recently considered this question at length, recommends a cooperative process for reform, guided by an executive-level council and workplace committees. 91

The following options for improving IT recruitment and retention, while not necessarily the recommendations of the author or the Bureau, are developed in detail below:

- Broad, skills-based job families grounded in commonly accepted functional definitions of IT work, updated regularly;
- Competitive salaries;
- Centralized recruiting and marketing;
- Coordinated career development;
- Investment in cost-effective training and learning across organizations; and
- Measuring, motivating and rewarding improved performance.

## Align Job Classifications with IT Work Functions

Job classifications are a cornerstone of the state's civil service system. California has nearly 5,000 job classifications, each of which is reachable via three non-interchangeable types of examinations (open, promotional, education and experience), resulting in nearly 15,000 separate hiring alternatives. The system is fragmented, time consuming and overly specialized. For example, most state job classes have fewer than two dozen workers. The system is expensive to operate. It requires considerable bureaucratic effort to enforce and maintain and imposes indirect costs on performance by making it difficult

to match job assignments with shifting needs. State civil service IT job classes—existing and proposed—do not accurately describe the work that needs to be done nor the skills required to accomplish it. This makes it hard to recruit skilled employees, set competitive salaries, and train for career development.

- DPA is developing a new IT job classification structure. Classes could be modeled on broad, industry-wide accepted IT work categories (see Table 1, page 7). The State Personnel Board could carefully consider the new proposed IT classification structure prior to its adoption.
- DPA's review of IT job classifications is long overdue. In the future, DPA could review IT classes on a yearly basis and plan on regular changes that take into account the evolution of technology, competition for skilled employees, and the state's business needs. The goal would be to keep the state's IT job classes in alignment with the job families used by the private sector, thereby maintaining competitive salaries and facilitating recruitment and career development. This ongoing effort could require additional funding.

## Fund Competitive IT Salaries

According to the Little Hoover Commission, the state's personnel system has a fundamental problem—"the lack of an official compensation policy." The Commission recommends that the state develop a set of common principles for what it hopes to accomplish with its compensation system, and that it also develop alternative procedures for setting salaries. For example, DPA's role as an administrative control agency may conflict with its responsibility to maintain a competitive compensation system.

In general, the state's IT salaries are not competitive and are a significant impediment to recruiting and retaining qualified individuals. Since 1995, state salaries have fallen behind by more than five percent relative to the cost of living, taking into account the 5.5 percent general salary increase effective April 1, 1999. Meanwhile, average IT salaries in the private sector have increased by approximately 20 percent, while salaries for workers with skills in high demand, such as networking, can increase that much in a single year. In order to be competitive, the state will probably have to increase IT compensation. The following options offer various means to implement that policy.

- Negotiate an IT salary increase policy, such as in the State of Massachusetts, that could exempt certain IT employees from the collective bargaining contracts or allow larger than general salary raises.
- Block grant "mission critical IT salary funds" to each department, apportioned on the basis of demonstrated need and the number of IT positions. The departments could determine which IT positions require proportionally larger salary increases for recruitment and retention purposes. Individuals in those positions would meet predetermined skills requirements.

- Measure and invest the savings from enhanced IT productivity and performance to fund cash bonuses, pay increases or other non-paying benefits (such as parking). This is called "gainsharing." Perhaps the Department of Finance could develop the methodology.
- Create a category of "career development" pay that rewards state IT employees who upgrade their skills in areas identified as high priorities by departmental leaders.
- Group job skills into broad bands, facilitating an IT employee's advancement up the career and pay ladder without having to change jobs or go into management.
- Enrich the state's Tier II retirement benefits for new IT employees. The timing might be advantageous, given current investment returns to the Public Employees Retirement System (PERS).
- Allow highly skilled IT employees to stay in IT instead of moving into management in order to get a salary increase. One way to accomplish this would be to establish a "super tech" job classification for highly skilled IT experts.
- Take into account regional pay differentials. This is an issue in the San Francisco Bay Area, where state agencies compete for IT employees in the nation's hottest IT job market. DPA could survey regional differences in IT salaries and recommend an adjustment.
- Survey salaries of comparable IT job families in the private sector and other
  government agencies at least once a year, and recommend adjustments as part of
  the state bargaining and management review process. Surveys should compare
  compensation, bonuses, stock options, training and certification pay and other
  enhancements. Some private consulting firms specialize in developing this kind
  of information.
- Tie compensation to performance. Businesses reward their IT employees with stock options, project completion bonuses and other performance rewards. This concept is controversial in California civil service and would need to be carefully developed in consultation with the unions.
- Upgrade the state's IT management salary structure, requiring significant IT experience and ongoing performance reviews. IT managers generally need to be more technically competent than their staffs and paid more. They are at a premium in the private sector, earning salaries and bonuses well above state compensation levels.
- The state could carefully evaluate its IT management structure so that it encompasses both technical and business management skills, adjusting salary to be competitive. For example, IBM Global Services assigns both a project

manager and a policy manager to its projects. Microsoft employs product managers who are "deep technicians with management skills."

# Streamline and Improve Recruitment and Selection

The Little Hoover Commission concludes in its recent report that California's state government personnel system is "increasingly complex and dysfunctional" and that "Public agencies do not have the capacity to recruit, select, train and manage the workforce needed to transform good policy into good programs." The state needs better data on its personnel system so that it can detect and quickly respond to IT staffing problems.

- The Legislature could require DPA and department personnel units to track how long IT employees stay in state service, where they go—promotions, lateral transfers, or to the private sector—and why they leave.
- DPA could develop useful measurements of quality by which to recruit and evaluate IT job applicants. This would acknowledge the reality that departments must fill positions promptly or lose them in the budget process. Data gathered by the IT Task Force suggests a significant (six percent) quality problem with some IT staff and managers.

State agencies rely primarily on passive IT recruitment methods and primarily target other departments' staff. There is very little outreach, even at local colleges and job fairs, and Internet recruitment is limited and very difficult to find. In contrast, private employers and other government entities aggressively seek and compete for the best new talent. The state should be able to leverage a coordinated recruitment effort. As Michael Porter notes, "Companies in vibrant clusters can tap into an existing pool of specialized and experienced employees, thereby lowering their search and transaction costs in recruiting...it can also be easier to attract talented people from other locations.... Clusters provide the capacity and flexibility to act rapidly." 94

Finding and hiring the best possible state IT employees requires state government-wide attention. The Department of Information Technology (DOIT) and DPA could create a joint task whose goal would be to develop a model IT recruitment effort. This should not take a long time—three months would be about right. An effective effort might:

- Identify recruitment opportunities on an ongoing basis, such as job fairs, university recruitment opportunities, and key IT websites. This information could be sent on a continual basis to department personnel and IT managers. A specialized position in SPB could administer this process.
- Cross-train departmental personnel staff and IT managers in effective IT
  recruitment and selection. Each should understand the others' needs and
  constraints and develop avenues for effective communication. Ideally, personnel
  would train IT managers in new recruitment skills and support them with
  consulting services.

- Give line IT managers broad authority to meet their business and staffing needs.
  They could, for example, determine the IT job classifications and pay levels for
  which they are recruiting, based on skills, with advice from personnel staff. This
  might require a policy directive from DPA.
- Consider hiring professional recruiters to meet immediate IT staffing needs.
- Develop expedited IT testing procedures, such as online general experience exams. Since it does not make sense for each department to do this separately, the State Personnel Board could administer the testing. SPB could be reimbursed for costs or seek additional funding from the Department of Finance.
- Make IT exam grading a top priority and develop a standard process by which qualified applicants can be identified, interviewed and hired quickly. SPB could monitor the recruitment and selection process on an ongoing basis to identify and resolve bottlenecks, providing regular reports to DOIT and DPA.
- Develop an online IT job bank on which all state departments could post openings and which would link to the relevant exams. This job bank could be marketed to online job markets, including IT magazines. It could have a direct access from the state Homepage.
- Create a model procedure whereby departments could expedite making a final job
  offer to promising candidates. This might include, for example, an IT manager
  and an HR person jointly working at a job fair. Currently there are significant
  time lags between recruitment, exams, interviews and final offers. Qualified IT
  applicants are hired away before completing the state examination and application
  process.
- Consider creating an entry-level or contingent employment status for new IT employees that could facilitate hiring, particularly of students.
- Develop long term relationships with local colleges that offer majors in IT fields. This might include internships and offering state IT specialists as lecturers.

The State could market itself better. For example, the CEO of Marimba, a Silicon Valley start-up company, states in an interview:

Government agencies, and IT groups within government agencies, are some of the most interesting areas for the application of new technology. In many cases, they are out in front, pushing the envelope.... This is something that should attract IT employees, developers, to work for government agencies. <sup>95</sup>

 The DOIT, SPB and DPA could jointly develop a state IT worker marketing campaign, focusing on skills gaps in critical IT job families. This might require funding for consultation with private businesses skilled in similar marketing efforts.

# Contracting

When organizations cannot recruit the IT personnel they require, they often contract for the needed skills and work. All of the companies interviewed for this report contract for some of their IT work, keeping key skills and management in-house. Contracting is not a panacea, as an organization needs to maintain an internal core level of skills and expertise, particularly in the IT area. This has been a subject of enormous controversy for the state and in a number of jurisdictions.

State departments could expand short term contracting for targeted IT skills they
are unable to hire. There are a number of companies that provide skilled IT
employees on a contractual basis. One impediment to this strategy could be
departmental budgetary restrictions on moving funds from personnel (salary) into
contracts.

#### Retention

State government needs to reward its valued IT employees in order to retain them. Competitive salaries and fringe benefits are one means, as discussed above. People can also be rewarded by creating an IT culture that offers broad and varied opportunities, promotes career development, and that enables and values innovation.

- DOIT, SPB and DPA could convene a formal, ongoing task force on IT retention to develop goals, strategies and an implementation plan. The task force might be composed of departmental IT and personnel managers, as well as key operational managers.
- The Legislature could block grant funds to departments for IT enrichment activities. Managers could enrich the work environment, including brown bag lunches, bringing in outside experts, sending IT staff to professional conferences and even creating sabbaticals. These activities might require funding and some loosening of control (such as on out-of-state travel). SPB could compile examples of best practices and publicize them.
- Non-pay incentives can provide effective rewards. These might include providing
  greater freedom of choice in IT work assignments, enabling and rewarding teams
  and delegating responsibility. Changing the state's IT workforce culture could
  require consultation between DPA, the unions, department personnel staff and IT
  managers. The Legislature could require such an undertaking.
- Several departments have successfully operated under more flexible IT personnel rules as pilot projects over the last several years. The State could allow other departments the same degree of flexibility. This would probably require additional legislation.

- According to the IT Task Force survey, many state IT managers are not
  conducting regular performance evaluations of their IT staffs. Review of private
  sector practices confirms that career development, performance feedback and
  training are important components of IT employee retention efforts. DPA could
  require IT managers to conduct frequent employee evaluations, including career
  development and training plans. Completion might be made a condition of
  management advancement.
- According to the IT Task Force Survey, there is some weakness in the state's IT
  management structure. The state could create a central pool of super-grade,
  highly qualified and compensated IT managers, recruited and managed by DOIT.
  These managers could move from department to department to meet immediate
  needs and provide technical assistance.
- DPA could examine whether state personnel is an appropriate background for lateral transfers into IT management positions and if not, recommend changes in promotional structures.
- Most state personnel units do not conduct exit interviews when employees leave.
  They thus cannot quickly identify problem areas and improve organizational
  deficiencies. DPA is crafting a general exit interview format for state managers
  that could be customized for IT positions. The information could be compiled to
  identify and address statewide IT personnel issues in a proactive manner.

## **Training**

High-performance organizations increase their investment in training. For example, businesses that win the coveted Malcolm Baldridge National Quality Award dedicate ten percent or more of their payroll to training. Companies surveyed for this report average two weeks of training for their IT employees per year. For a public sector comparison, the Australian government reserves five percent of its personnel costs for education and training. <sup>96</sup>

The State under-invests in its employees—its human capital—in the IT area. Expanding training opportunities could enlarge the pool of qualified IT applicants by preparing existing employees to move into more challenging positions.

• Given the current "training deficit," the Legislature could appropriate a one-time budgetary augmentation equivalent to three percent of IT personnel costs for immediate training. †††† Each department could devise a business plan, tied to its strategic plan, demonstrating its skills needs and outlining how the training would assist in meeting those needs.

<sup>††††</sup> The Gartner Group finds that "Best-in-class organizations spend 7 to 10 percent of IT payroll on training...5 percent can ensure a well-trained staff...[our] average client spends 2 to 3 percent." J. Weller, K. Potter, B. Stewart, *The Dollars and Sense of IT Professional Training*, Research Note, Key Issue Analysis, January 20, 1998, p. 2.

- The Department of Finance could revise its budgeting practices to ensure that IT positions are funded at the "three percent" training level in the future to maintain staff skills and expertise. This might require legislative direction.
- Since IT is a technical and rapidly changing field, the state could continue to rely heavily on outside contractors to provide IT training. DPA or DOIT could maintain a list of quality training programs, as evaluated by state employees and others taking their courses.
- State IT managers could also benefit from additional training opportunities including (but not limited to) project management, personnel system operations, teamwork processes, business management skills, problem solving techniques, communication techniques and leadership/motivation.
- The state could make just-in-time training available to employees over the
  Internet or via internal networks. This is a very cost effective means of delivering
  customized training and could replace or supplement classroom training. DPA
  could recommend effective training modules, in consultation with DOIT, for
  departmental use, and manage the Intranet.
- The state could follow the federal government's lead and adopt the Office of Personnel Management's regulations requiring employees who receive costly training to agree to remain in federal service for a specified period of time.

## **ENDNOTES**

<sup>&</sup>lt;sup>1</sup> Thomas J. Buckholtz, *Information Proficiency*, Van Nostrand Reinhold, 1995, p. 7.

<sup>&</sup>lt;sup>2</sup> Brent Schlender, "E-Business According to Gates," *Fortune*. April 12, 1999, p. 73.

<sup>&</sup>lt;sup>3</sup> John Thomas Flynn, Chief Information Office, State of California, in letter to Dean Misczynski, Director, California Research Bureau, July 6, 1998.

<sup>&</sup>lt;sup>4</sup> Erin Callaway, "IT Openings May Apply," *PC Week*. February 23, 1998, p. 15-23.

<sup>&</sup>lt;sup>5</sup> Task Force on Information Technology Staff Recruitment & Retention, *Protecting and Improving the* Delivery of Services to California. Sacramento, 1998.

<sup>&</sup>lt;sup>6</sup> Michael Murray, Prepared Testimony of Michael Murray, Vice President, Human Resources and Administration, Microsoft Corporation, Before The Senate Judiciary Committee; The High Tech Worker Shortage and Immigration Policy. February 25, 1998.

<sup>&</sup>lt;sup>7</sup> See for example, Tom Abate, "Tech Staff Shortage Could Be A Myth," San Francisco Chronicle, January 22, 1998.

<sup>&</sup>lt;sup>8</sup> See for example, United States General Accounting Office, *Information Technology: Assessment of the* Department of Commerce's Report on Workforce Demand and Supply. GAO/HEHS-98-106, March 1998. <sup>9</sup> Leslie Goff, "Enough is enough: Computerworld's 12<sup>th</sup> Annual Salary Survey," Computerworld. September 7, 1998.

<sup>&</sup>lt;sup>10</sup> Ibid.

<sup>&</sup>lt;sup>11</sup> Carol Rosen, "Silicon Valley is still Mecca to many," *EBN News*, March 30, 1998.

<sup>&</sup>lt;sup>12</sup> Thomas Mahan, presentation of the results of the Interim study conducted in 1997, Fisher Center for Management and Information Technology, University of California, Berkeley, August 26, 1998.

<sup>&</sup>lt;sup>13</sup> Blake Harris, "The Return of Entrepreneurial Government," Government Technology, February 1999,

p. 7.

George Ardlos and Scott Thum, "The Rocket Under the Tech Boom: Heavy spending by Basic

<sup>&</sup>lt;sup>15</sup> United States General Accounting Office, Government Management: Addressing High Risks and Improving Performance and Accountability, GAO/T-OCG-00-23, February 10, 1999, p. 14.

<sup>&</sup>lt;sup>16</sup> Mindy Blodgett, "The CIO Starter Kit," CIO Magazine, www.cio.com/, May 15, 1999.

<sup>&</sup>lt;sup>17</sup> Brent Schlendor, "E-Business According to Gates," *Fortune*. April 12, 1999, p. 74.

<sup>&</sup>lt;sup>18</sup> Diane Tunick Morello, "IT retention and recruitment, public sector," July 30, 1998, Memo to Dan Sumpter, California Department of Transportation.

<sup>&</sup>lt;sup>19</sup> American Electronics Association, California Cybercities; California's Hottest High-Technology Metropolitan Areas, 1998.

<sup>&</sup>lt;sup>20</sup> Op. Cit., p. 5-13.

<sup>&</sup>lt;sup>21</sup> Op.Cit. p. 6-5.

<sup>&</sup>lt;sup>22</sup> Center for Continuing Study of the California Economy, California County Projections, 1998 edition, p. 2-6.
<sup>23</sup> American Electronics Association, p. 9.

<sup>&</sup>lt;sup>24</sup> Op. Cit., p. 6.

<sup>&</sup>lt;sup>25</sup> Kathleen Melymuka, "We're in the money," *Computerworld*, www.computerworld.com/, August 21,

Randy Katz, "Letter to the Editor," *San Francisco Chronicle*, April 4, 1998.

27 Leslie Goff, "Enough is Enough," *Computerworld*, <a href="www.computerworld.com/">www.computerworld.com/</a>, September 22, 1998.

<sup>&</sup>lt;sup>28</sup> Steve Alexander, "Origins of a shortfall," *InfoWorld*, February 8, 1999, page 93.

<sup>&</sup>lt;sup>29</sup> Mel Duvall, "Where the jobs are," *Inter@ctive Week Online*, October 19, 1998.

<sup>&</sup>lt;sup>30</sup> Brent Schlender, "The Edison of the Internet," Fortune, February 15, 1999, p. 87.

<sup>&</sup>lt;sup>31</sup> Michael Porter, "Clusters and the New Economics of Competition," *Harvard Business Review*, November-December 1998, p. 78.

<sup>&</sup>lt;sup>32</sup> Op. Cit. p. 3.

<sup>33</sup> Steve Alexander, "Origins of a Shortfall," *InfoWorld*, February 9, 1999, p. 93.

<sup>&</sup>lt;sup>34</sup> "Salary Survey: 1998 Bonuses," <u>http://www.proengineer,com/salsur.html/</u>.

<sup>&</sup>lt;sup>35</sup> Alan, R. Earls, "Retention getters; the 25 companies that excel at IT retention," *Computerworld*, September 22, 1998.

- <sup>36</sup> Phil Levine, "Employees Want More from Pension Plans: Survey Shows Some Employers Responding," Pensions & Investments, Crain Communications, Inc., October 13, 1997.
- <sup>37</sup> For a discussion of this debate, see U.S. General Accounting Office, *Information Technology:* Assessment of the Department of Commerce's Report on Workforce Demand and Supply, GAO/HEHS-98-106, March 1998.
- <sup>38</sup> Miranda Ewell, "On The Hiring Line," San Jose Mercury News, www.mercurycenter.com/, July 28, 1998.
- <sup>39</sup> List compiled by the Gartner Group's Diane Tunick, as cited in Wayne Hanson, "How to Attract and Retain Qualified IT Staff," Government Technology, May 1998, p. 15.
- <sup>40</sup> Robert Bellinger, "Job Recruiting Rages on the Web," *EE Times*, June 8, 1998. <sup>41</sup> "Life on the Web," *Fortune Winter 1999 Technology Buyer's Guide Special*, November 16, 1998, p.p. 252-254.
- Greg Scileppi, "Ramping Up Your IT Retention," www.computerworld.com/, September 22, 1998.
- <sup>43</sup> Nancy Rivera Brooks, "Workers Place More Value in Training, Flexibility than Pay, Surveys Show, Los Angeles Times, May 2, 1999, p. C5.
- <sup>44</sup> Mirianne Kolbasuk McGee, "IT-Skills Shortage Needs Employee Focus," *InformationWeek*, on TechWeb.com/, July 30, 1998.
- <sup>45</sup> Dr. Thomas F. Mahan, "The Emerging Workforce: Its Attitudes, Motivations, and Expectations," presentation sponsored by Interim Services Inc., June 29, 1998, Sacramento, California.
- <sup>46</sup> Robert Moskowitz, "Retaining Valuable High-Tech Employees," Experience on Demand, www.experienceondemand.com, January 22, 1999.

  47 "Technology-drive business leaders," *The Economist*, September 12, 1998, p. 13.
- <sup>48</sup> Henry Mintzberg, "Covert Leadership: Notes on Managing Professionals," *Harvard Business Review*, November-December 1998, p. 140.
- <sup>49</sup> Alan R. Earle, "Retention getters: the 25 companies that excel at IT retention," *Computerworld*, www.computerworld.com/, September 22, 1998.
- 50 Ibid.
- <sup>51</sup> Gary Arnold and Sheila Smith, "Expert Advice: Growing for Keeps," *CIO Magazine*, November 1, 1998.
- <sup>52</sup> Barb Cole-Gomolski, "Techies Want More Than Pay," *Computerworld*, www.computerworld.com/, September 22, 1998.
- <sup>53</sup> Gary Arnold and Sheila Smith, p. 2.
- <sup>54</sup> Ibid.
- <sup>55</sup> Anthony P. Carnevale, Education and Training for America's Future, The Manufacturing Institute, 1998,
- <sup>56</sup> Justin Hibbard, "The Learning Revolution—The Web and other collaborative technologies are helping companies redefine corporate learning—and do a better job of training employees," *InformationWeek*, March 9, 1998.
- <sup>57</sup> Ellen Perlman, "The Costliest Component," *Governing*, March 1999, p. 30.
- <sup>58</sup> Tod Newcombe, "Intra-Nets; More Than a Messenger," *Government Technology*, March 1999, p. 52.
- <sup>59</sup> "Community College System Enters Agreement with Cisco to Provide High Tech, High Demand Training for Students," PR Newswire, June 16, 1998.
- <sup>60</sup> Little Hoover Commission, Of the People, by the People: Principles for Cooperative Civil Service Reform, January 1999, p. 15.
- <sup>61</sup> Ibid.
- <sup>62</sup> Little Hoover Commission, Of the People, by the People: Principles for Cooperative Civil Service Reform, January 1999, p. 14.
- 63 Ibid.
- <sup>64</sup> Health and Welfare Agency Data Center, "Evaluation of the Health and Welfare Agency Data Center Demonstration Project," Memorandum to the State Personnel Board, January 9, 1998.
- <sup>65</sup> See IT Task Force survey.
- 66 Howard Risher, Ph.D. and Cary E. Randow, CCP, Public Sector Compensation: "An Overview of Present Practices and Emerging Trends," American Compensation Association, 1998, p. 14 <sup>67</sup> Op. Cit., p. 20.

- <sup>68</sup> John Kreiser, "Technologist vs. Manager: Staying on the Technology Side Shouldn't Have to Take a Toll on you Salary," *InformationWeek*, April 5, 1999, p. 102.
- <sup>69</sup> Patrick Thibodeau, "States Consider Outsourcing IT Services", *Corporate Strategies News*, <a href="http://www2.computerworld.com/home/online...aultview/5FD14B7E7712F682852565D2004F6D26">http://www2.computerworld.com/home/online...aultview/5FD14B7E7712F682852565D2004F6D26</a>.
- <sup>70</sup> U.S. Office of Personnel Management, *Recruiting and Retaining Information Technology Professionals*, November 1998, p. 5.
- <sup>71</sup> Ibid. pp. 4-5.
- <sup>72</sup> Ibid.
- <sup>73</sup> Ibid. p. 4.
- <sup>74</sup> Information Technology Task Force survey, September 1998.
- <sup>75</sup> Bob Nelson, *1001 ways to reward employees*, Workman Publishing Company, Inc., New York, 1994,
- p. xi. <sup>76</sup> Ibid.
- <sup>77</sup> Ibid.
- <sup>78</sup> Steve Alexander, "Keeping workers happy: Ten low-cost strategies can keep employees from job hunting," *Infoworld*, Dec. 13, 1998, pp. 91-92.
- <sup>79</sup> Ibid
- <sup>80</sup> Louisa Shepard, "Tech Work-force Crunch has Agencies Scrambling to Train Their Own," wysiwyg:idgnet\_main.2/http://www.civic.com/pubs/1999/feb/civ-cover-2-8-99.html, p. 1.
- 81 Ibid. p. 3.
- <sup>82</sup> "Developing a High Performance 21<sup>st</sup> Century Workforce for California Government," *The Governor's* 21<sup>st</sup> Century Training Action Team, February 1998, p. 21.
- 83 Ibid.
- <sup>84</sup> "Finding Talent for the Next Century: How to Retain and Attract Emerging Workers," <a href="http://www.interim.com/library/survey/emerging/retain.htm">http://www.interim.com/library/survey/emerging/retain.htm</a>, p. 4.
- <sup>85</sup> Jill W. Schamberger, *Maryland and Virginia Strive to Improve Their Information Technology Workforce*, National Governors Association, April 19, 1999.
- <sup>86</sup> Jan Grecian, "Jefferson City Information Technology Coalition," State of Missouri, Office of Information Technology, December 1997, p. 3.
- <sup>87</sup> Ibid. p. 4.
- <sup>88</sup> Michael Porter, "Clusters and the New Economics of Competition," *Harvard Business Review*, November-December 1998, pp. 78, 80.
- <sup>89</sup> Ibid
- <sup>90</sup> Mark G. Popovich, editor, *Creating High Performance Government Organizations*, Alliance for Redesigning Government, Jossey-Bass Publishers, 1998, p. 144.
- <sup>91</sup> Little Hoover Commission, *Of the People, By the People: Principles for Cooperative Civil Service Reform,* January 1999.
- <sup>92</sup> Little Hoover Commission, *Of the People, By the People: Principles for Cooperative Civil Service Reform,* January 1999, p. 61.
- <sup>93</sup> Richard R. Terzian, Chairman, "Letter to the Governor and members of the Legislature," *Of the People, By the People: Principles for Cooperative Civil Service Reform,* Little Hoover Commission, January 1999. <sup>94</sup> Michael Porter, pp. 80, 83.
- <sup>95</sup> Ed Caldwell, "The Energy Edge," *Government Technology*, February 1999, p. 21.
- <sup>96</sup> Mark G. Popovich, p. 157.